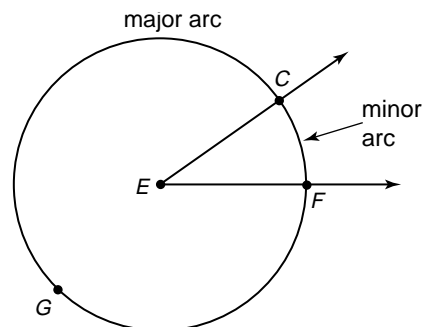


Study Guide

Student Edition
Pages 452–458

Angles and Arcs

An angle whose vertex is at the center of a circle is called a **central angle**. A central angle separates a circle into two arcs called a **major arc** and a **minor arc**. In the circle at the right, $\angle CEF$ is a central angle. Points C and F and all points of the circle interior to $\angle CEF$ form a minor arc called arc CF . This is written \widehat{CF} . Points C and F and all points of the circle exterior to $\angle CEF$ form a major arc called \widehat{CGF} .



You can use central angles to find both the degree measure and the length of an arc. The arcs determined by a diameter are called semicircles and have measures of 180.

Examples: In $\odot R$, $m\angle ARB = 42$, $RB = 12$, and \overline{AC} is a diameter.

- 1 Find $m\widehat{AB}$ and $m\widehat{ACB}$.

Since $\angle ARB$ is a central angle and $m\angle ARB = 42$, then $m\widehat{AB} = 42$.

$$m\widehat{ACB} = 360 - m\widehat{AB} = 360 - 42 \text{ or } 318$$

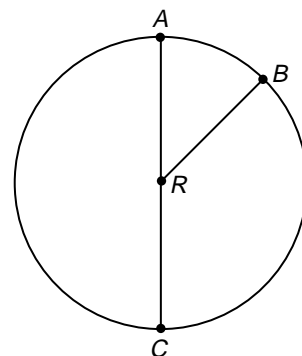
- 2 Find the length of \widehat{AB} .

First, find what part of the circle is represented by $\angle ARB$.

$$\frac{42}{360} = \frac{7}{60}$$

So, the length of \widehat{AB} is $\frac{7}{60}$ of the circumference of $\odot R$.

$$\begin{aligned} \text{length of } \widehat{AB} &= \frac{7}{60}(2\pi r) \\ &= \frac{7}{60}(2\pi)(12) \text{ or about } 8.8 \text{ units} \end{aligned}$$



Refer to $\odot P$ for Exercises 1–8. If \overline{SN} and \overline{MT} are diameters with $m\angle SPT = 51$ and $m\angle NPR = 29$, determine whether each arc is a minor arc, a major arc, or a semicircle. Then find the degree measure of each arc.

1. $m\widehat{NR}$

2. $m\widehat{ST}$

3. $m\widehat{TSR}$

4. $m\widehat{MST}$

If $MT = 15$, find the length of each arc. Round to the nearest tenth.

5. \widehat{NR}

6. \widehat{ST}

7. \widehat{TSR}

8. \widehat{MST}

